

# SOLAR-5

## 5 MVA, 0.8 P.F. Container Load Bank



### Overview

- Very high capacity, resistive/inductive portable Load Bank
- 5.0MVA, 4.0MW, 3.0MVAR
- Low voltage to 690vAC
- ISO 20' Container style enclosure
- Digital load control

### Features

The Simplex Solar-5 is a very large capacity, resistive/inductive portable load bank capable of 0.8 power factor loads to 5.0MVA (4.0MW, 3.0MVAR). The Solar-5 is designed for low voltage application to 690vAC. PLC based digital load control with touchscreen operator interface is standard. The unit is network capable with other Solar Load Banks as well as most standard Simplex Load Banks in order to form large, ultra high capacity systems which can be controlled from a single operator interface with totalized data acquisition.

The Solar-5 is packaged in a purpose-built, ISO 20', high-cube container STYLE enclosure. Rather than re-purposing used ISO shipping containers, Simplex has ingeniously designed a purpose-built enclosure which includes

the important design features of a container, including holding true to ISO container dimensions, incorporating ISO container corner locking pins and using heavy-duty formed and tubular steel construction in a massive, rugged weldment. A purpose-built enclosure eliminates the compromises inherent in reworking a used shipping container. The resultant enclosure provides 4-sided service access and generous internal space while maintaining structural integrity.

The Solar-5 is intended for severe portable duty. As such, the unit buttons-up tight when not in use. Hot air exhaust is vertical, through roof mounted electrically operated louvers. Air intakes are on the side and covered by manual hatches. The load bank is also suitable for stationary application.

Two means of power connection are provided: copper bus bars for bolt-on cables, and Cam-Lock type connectors for Cam-lock type terminated cable.

The Solar-5 is equipped with the advanced Simplex Digital Control System which provides touchscreen operator interface, keypad load entry, data display and acquisition, Ethernet remote control. The load bank is equipped with a local operator interface

which is removable for remote control. Software is available for control from a user supplied Windows PC. Simplex AutoTest software is available for full testing automation.

### Features

- Rugged, purpose built container style enclosure based upon standard ISO 20-foot, high-cube design
- Formed and tubular steel massive weldment
- Powered exhaust louvers
- Generous internal space and 4-sided access
- Power-Web resistive load elements
- Iron-core inductors
- IEC contactors
- Branch circuit fuse protection
- Copper bus bar and Cam-Lock style cable connection provisions
- Comprehensive malfunction detection system
- Digital control and data acquisition
- Network capable
- Automation software available

### General Specifications

- Capacity:** 5.0MVA, 0.8 power factor  
4.0MW, resistive  
3.0MVAR, inductive
- Voltage:** Single voltage, specify one:  
480vAC, 3-phase, 3-wire  
600vAC, 3-phase, 3-wire  
690vAC, 3-phase, 3-wire  
416vAC, 3-phase, 3-wire  
380vAC, 3-phase, 3-wire  
  
De-rates as the square of the voltage beneath these voltages.
- Frequency:** 60 Hertz or 50 Hertz, specify one
- Load Steps:** 5KW / 3.75KVAR digital load step resolution
- Duty Cycle:** Continuous
- Ambient Temp.:** 125°F
- Exhaust Rise:** 150°F (hot spot temps to 500°F)

**Airflow Required:** 75,000 CFM

#### Control Power:

- Selectable internal or external.
- External power requirements:  
3 x 15HP cooling fan motors  
Control power load: 10.0 KVA

#### Enclosure:

Purpose-built, container style steel enclosure with ISO 20' container dimensions, corner locking pins. Outdoor weatherproof. Painted dark grey polyurethane over epoxy primer.

**Dimensions:** 240" W x 96" D x 100" H

**Net Weight:** Approx. 30,000 pounds

### Principle Systems

The Load Bank is a completely self-contained, freestanding unit which includes all load elements, load control devices, load element branch circuit fuse protection, main load bus and terminals, cooling system, control power supply, digital controller with data acquisition and malfunction detection system and weatherproof enclosure.

**Resistive Load Elements:** Simplex Powr Web: Open wire, helically wound, chromium alloy, load element thermally derated to 60%. 5% tolerance, 2% balance. .995 p.f. Element wire mechanically supported over entire length such that if a wire should break, the broken wire segments will not short to adjacent conductors or to ground. UL Recognized

**Inductive Load Elements:** Iron-core, non-saturable air-gap type, with aluminum windings, varnish/epoxy coated. 150C rise. 220C insulation

**Load Control:** Branch circuit contactors, each 50 KW resistive circuit max, each 75 KVAR inductive circuit max. Contactors have enclosed silver surfaced contacts, 120V coils; electrically operated and electrically held. Contactors are IEC type

**Element Circuit Protection:** Branch circuit fuses, each 50KW resistive branch circuit max, 75KVAR inductive circuit max. , 600v, 200kAIC, current limiting type.

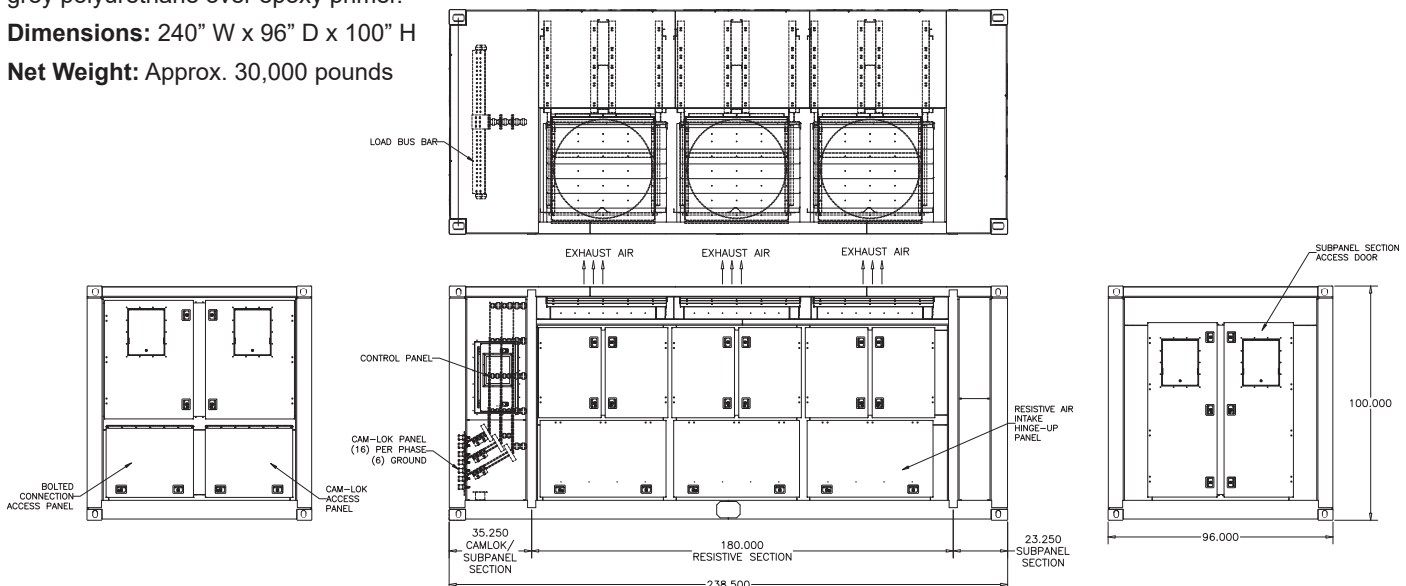
**Power Wiring:** 150°C insulated; color-coded and numbered.

**Control Wiring:** 105°C numbered

**Power Connection:** Plated copper bus bar for bolt-on cable connections, behind hinged door and Cam-Lock style plug-in connectors, bulkhead mounted behind hinged door. 400A, 4/0 connectors.

**Cooling:** Forced air, vertical airflow, top exhaust. 3 x 15HP, 3-phase, TEFC motor direct driving cast aluminum fan blades. Circuit breaker combination motor starters. Electrically powered exhaust louvers, via linear actuator, with position indicating output. Manual air intake doors with door limit switches

**System Protection:** Sensors, alarms, lock-outs as appropriate, for the following: Fan Failure, High Exhaust Temperature, High Intake Temperature, Exhaust Louver Open/Closed, Each Louver, Intake Door Open Closed, Access Door Open, Each Door, Fan Motor Overload, and Emergency Stop.



## Options

Dual voltage with reduced overall capacity:

- 240/480v
- 416/480v
- 480/600v
- 480/690v

Addition of capacitive load to 0.90 p.f. leading, with reduced overall capacity

Special use construction

- Marine
- Arctic

Highway trailer and trailer accessories

- Cable reels
- Power cable sets

Infinitely variable load control

Automation software

Windows PC control software

Remote control packages

- Suitcase controller
- Remote control cables/reels

Enclosure options

- Custom paint colors and markings
- Stainless steel construction



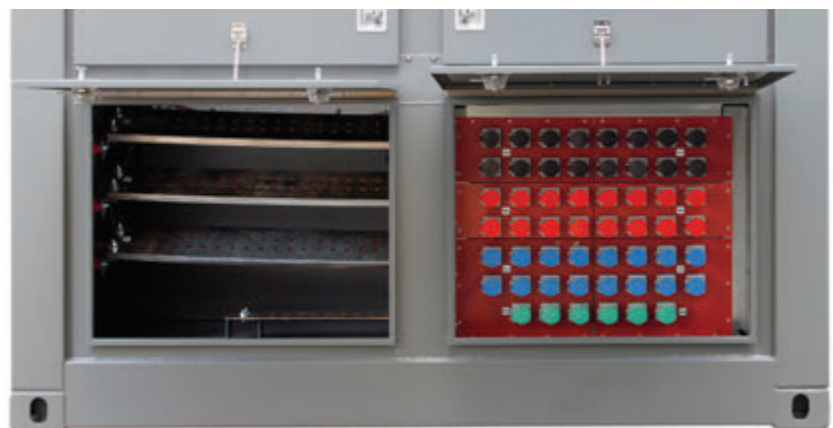
Solar-5 with all ventilation and service doors closed and ready for transport.



Purpose built enclosure insures ample interior space and service access. Shown above are readily accessible inductive elements.



The touchscreen operator interface mounted in a protective enclosure is removable for remote control.



Solar-5 is equipped with two means of power cable connection: copper bus bars for bolted connection of cables and Cam-Lock style connectors.

## Digital Control and Data Acquisition System

PLC based digital control with 8-inch color TFT touchscreen operator interface.

### Functions

- Control power source and voltage level detection
- Malfunction detection and protection
- Direct access (keypad) load control
- Alternate mimic panel load control
- Basic automation of load control
- Field adjustable exhaust temperature limits with temperature display
- Built-in control from customer supplied computer

### Instrumentation

Digital power transducer to digital controller and meter displays on touchscreen:

- 3-phase voltage (each, L-L)
- 3-phase current (each line)
- Frequency
- KW
- KVAR
- Power-factor

### Data Acquisition

- Captures and records all electrical values
- Start recording/stop recording screen buttons
- One second sample rate
- Exports text file to detachable flash drive which plugs into USB port

### Outputs

MODBUS (standard) or BacNet (optional):

- Load applied
- Each electrical value as above



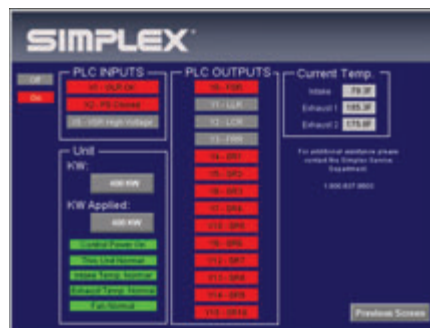
Main Screen



Monitoring Screen



Metering Trends Screen



Diagnostics Screen



Maintenance Screen